

CLAIMS

1. A ferroelectric capacitor of the type having a top electrode, a ferroelectric thin film, and a bottom electrode, characterized in that said ferroelectric thin film is a perovskite-type oxide containing a metal element and said top electrode contains an
5 intermetallic compound composed of said metal element and a noble metal.

2. A ferroelectric capacitor of the type having a top electrode, a ferroelectric thin film, and a bottom electrode, characterized in that said ferroelectric thin film is a perovskite-type oxide containing a metal element and said top electrode and bottom
10 electrode contain an intermetallic compound composed of said metal element and a noble metal.

3. A ferroelectric capacitor of the type having a top electrode, a ferroelectric thin film, and a bottom electrode, characterized in that said ferroelectric thin film is a perovskite-type oxide containing a metal element, and at least either of said top electrode or said bottom electrode has a multilayer structure formed by sequentially laminating a
15 layer containing an intermetallic compound composed of said metal element and a noble metal and a layer of said noble metal, the former being adjacent to the interface of the ferroelectric thin film.

4. A ferroelectric capacitor of the type having a substrate, a buffer layer, a bottom electrode, and a ferroelectric thin film, which are sequentially laminated,
20 characterized in that said buffer layer is made of a transition metal or a nitride thereof, said ferroelectric thin film is made of a perovskite-type oxide containing a metal element, and said bottom electrode contains an intermetallic compound composed of said metal element and a noble metal.

5. A ferroelectric capacitor as defined in claim 4, in which said noble metal
25 is Pt, said intermetallic compound is one which is composed of Pb and Pt, with the Pb

content being 50 atom% or less, and said transition metal is Ti.

6. A ferroelectric capacitor of the type having a top electrode, a ferroelectric thin film, and a bottom electrode, characterized in that said ferroelectric thin film is made of a perovskite-type oxide containing a metal element and said top electrode is made of a substance composed of Pt and Pb in the range of 10 atom% to 50 atom%.

7. A ferroelectric capacitor as defined in any of Claims 1 to 6, in which said intermetallic compound is one which has a Ll_2 type crystal structure represented by the composition formula of Pt_3Pb .

8. A ferroelectric capacitor as defined in any of Claims 1 to 6, in which said intermetallic compound is one which has a crystal structure based on a face centered cubic lattice.

9. A ferroelectric capacitor as defined in any of Claims 1 to 6, in which said bottom electrode has a crystal structure based on a face centered cubic lattice and orients mainly in the (111) plane, (100) plane, or (110) plane.

10. A ferroelectric capacitor as defined in any of Claims 1 to 6, in which both said ferroelectric thin film and said bottom electrode orient mainly in the (111) plane, (100) plane, or (110) plane.

11. A ferroelectric capacitor of the type having a top electrode, a ferroelectric thin film, and a bottom electrode, characterized in that said bottom electrode is of double layer structure composed of a first layer of metal having a face centered cubic lattice and a second layer of an alloy containing said metal, and the difference in lattice constant between said first layer and said second layer is 3.5% or less.

12. A ferroelectric capacitor of the type having a top electrode, a ferroelectric thin film, and a bottom electrode, characterized in that at least either of said top electrode or said bottom electrode has the basic structure of a face centered cubic

lattice, and the difference in lattice constant between said bottom electrode and said ferroelectric thin film is 1% or less.

13. A ferroelectric capacitor of the type having a top electrode, a ferroelectric thin film, and a bottom electrode, characterized in that at least either of said
5 top electrode or said bottom electrode has the basic structure of a face centered cubic lattice, and the difference in lattice constant between said bottom electrode and said ferroelectric thin film is 1% or less.

14. A ferroelectric capacitor as defined in any of Claims 1 to 6, in which said ferroelectric thin film has a thickness of 1000Å or less.

10 15. A ferroelectric memory cell in which the ferroelectric capacitor defined in any of Claims 1 to 14 is formed on the gate of a semiconductor field effect transistor.

16. A ferroelectric memory cell in which the ferroelectric capacitor defined in any of Claims 1 to 14 is formed as the capacitor of the semiconductor MOS part.

15 17. A semiconductor device which has the ferroelectric memory cell defined in Claim 15 or 16.

18. A system LSI which has the ferroelectric memory cell defined in Claim 15 or 16.

19. An IC card which has the ferroelectric memory cell defined in Claim 15 or 16.

20. A method of forming a ferroelectric capacitor comprising:
- forming a buffer layer on a substrate, said buffer layer being comprised of a transition metal or a nitride thereof;
- forming a bottom electrode on said buffer layer, wherein said bottom electrode
- 5 includes an intermetallic compound comprised of a metal element and a noble metal; and
- forming a ferroelectric thin film on said bottom electrode, wherein said ferroelectric thin film is comprised of a perovskite-type oxide containing said metal element.
- 10 21. A method of forming ferroelectric capacitor as defined in claim 21, in which said noble metal is Pt, and said intermetallic compound is one which is composed of Pb and Pt, with the Pb content being 50 atom% or less, and said transition metal is Ti.
22. A method of forming a ferroelectric capacitor according to claim 20,
- 15 further comprising forming a top electrode on said ferroelectric thin film, wherein said top electrode is formed as a multilayer structure by sequentially laminating a layer containing an intermetallic compound comprised of said metal element and a noble metal and a layer of said noble metal, the former being adjacent to the interface of the ferroelectric thin film.